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OS0MO-G

OSCILLOSCOPE

1. GENERAL. This procurement requires a general purpose, portable, solid-state, dual-trace oscilloscope.

2. CLASSIFICATION. Type II, Class 3, Style D, and Color R in accordance with MIL-T-28800 for shipboard applications. A tilt bail handle is required.

3. OPERATIONAL REQUIREMENTS. The equipment shall be capable of operation within the minimum ranges, accuracies, limits, and specifications identified below. A digitizing oscilloscope is acceptable for this application provided that it can duplicate the desired display of an acceptable analog oscilloscope. If a digitizing oscilloscope is provided, and said unit never enters an uncalibrated condition, indicators are not required.

3.1 Vertical system. Unless otherwise specified below, requirements apply to two identical channels with or without probes attached. A control shall be provided to invert the waveform through at least one of the channels. Band-width and rise time measurements are specified with the equipment driven from a terminated 50 ohm source at the vertical inputs.

3.1.1 Bandwidth. DC to 200 MHz minimum. AC low frequency roll off: 100 Hz or less with X10 probe.

3.1.1.1 Bandwidth limiting. A provision shall be made to limit high-frequency interference. Maximum limit: 30 MHz.

3.1.2 Vertical deflection factor. 2 mV/div to 5 V/div continuously variable between calibrated steps. Deflection accuracy: ±3%. An uncalibrated condition indicator is required.

3.1.3 Display mode selector. The vertical mode switch(es) shall select channel 1, channel 2, alternate, and chop modes.

3.1.4 Maximum input voltages. At any vertical range setting: 250V (dc + peak ac at 10 kHz or less).

3.1.5 Input Impedance. 1 megohm shunted by 15 pF, nominal, switchable to 50 ohms ±1%.

3.2 X-Y operation. Operation shall be through the vertical input channels. Range: 2 mV/div to 5 V/div. Accuracy: ±3%. Bandwidth: dc to 3 MHz. Maximum phase difference between channels: 1° from dc to 1 MHz and 3° from 1 to 2 MHz.

3.3 Horizontal display modes. The horizontal display mode switch(es) shall select A only, A Intensified, and B Delayed.

3.3.1 Time base A. Time base A sweep rates shall be from 10 ns/div to 0.5 s/div in calibrated steps. A X10 magnifier shall be provided.

3.3.2 Time base B. Time base B sweep rates shall be from 10 ns/div to 50 ms/div in calibrated steps.

3.3.3 Time bases A and B accuracy. Unmagnified mode: ±2%. Magnified mode: ±3%.

3.3.4 Calibrated sweep delay. Variable from 50 ns/div to 0.5 s/div. Accuracy: ±1%.

3.3.5 Variable time control. The time bases shall be continuously variable between each step. An

uncalibrated condition indicator is required.

3.4 Triggering. Time bases A and B shall be capable of internal and external triggering.

3.4.1 Time base A triggering modes. Time base A shall have normal, automatic, and single sweep trigger modes.

3.4.2 Time base A triggering sources. Time base A shall have normal, channel 1, channel 2, line, and external trigger sources.

3.4.3 Time base B triggering modes. Time base B trigger modes shall be automatic and triggered.

3.4.4 Time base B triggering sources. Time base B shall have normal, channel 1, channel 2, and external trigger sources.

3.4.5 Time base A and B trigger coupling. DC, AC, low-frequency rejection, and high frequency rejection.

3.4.6 Time base A and B trigger sensitivity. 0.7 vertical division or less internal or 50 mV or less external from dc to 40 MHz, decreasing to 1.5 vertical divisions internal or 250 mV external at 200 MHz.

3.4.7 Trigger level and slope. Selection of triggering at any point on the displayed waveform shall be provided.

3.4.8 Maximum external trigger input. ±20V or 40V peak-to-peak. External trigger damage level: 250V (dc + peak ac) minimum.

3.4.9 Trigger hold-off: A variable trigger hold-off control shall be provided for the A time base.

3.5 Amplitude calibrator. A calibrator signal shall be provided through a front-panel connector and shall have protection from damage when grounded. Accuracy: ±1% into 1 megohm.

3.6 Display. The display shall be a CRT. The CRT shall have an 8 x 10 division display area with no less than 0.8 cm/div. The horizontal and vertical centerlines shall be marked in 0.2 subdivision increments and in 1 division cardinal increments. The graticule shall be of the internal, nonparallax type.

3.7 Digitizing oscilloscope requirements. If a digitizing oscilloscope is provided for this application, it shall have the features detailed in 3.7.1 through 3.7.5.

3.7.1 Sample rate. 200 MSa/s, minimum.

3.7.2 Vertical resolution. 8 bits, minimum.

3.7.2.1 Effective bits. 6 minimum.

3.7.3 Horizontal record length. 500 points, minimum.

3.7.4 Parametric measurements. The equipment shall be capable of automatically measuring and displaying the following parameters of the displayed signal: period, frequency, width (+ and -), rise time, fall time, peak (+ and -), peak-to-peak, and rms amplitude. Rise and fall times shall be measured between the proximal and distal points, and width shall be measured between the mesial points of pulse waveforms. Pulse parameters shall be as defined in IEEE Standard 194-1977, "Standard Pulse Terms and Definitions."

3.8 Automatic setup. The equipment shall be equipped with a single push-button control that will initiate automatic adjustment of the vertical and horizontal deflection factors and trigger level for an optimized display of the input signals. This function shall operate with signals exceeding 1% duty cycle and frequencies of 50 Hz.

4. GENERAL REQUIREMENTS.

4.1 Power source. MIL-T-28800 nominal and dc internal power source requirements are invoked as detailed below. As an alternative to dc internal power, an external, battery powered, ac source may be provided. This source shall meet the requirements of paragraphs 2, 4.1.2 and 4.2.

4.1.1 Nominal power source. Maximum power consumption: 400W.

4.1.2 DC internal power source. Internal batteries and charger are required. Minimum operating time shall be 1 hour following a maximum recharge time of 16 hours.

4.2 Weight. 20 kg (44 lb) maximum.

4.3 Digital interface. A digital interface is required in accordance with MIL-T-28800.

4.4 Lithium batteries. Per MIL-T-28800, lithium batteries are prohibited without prior authorization. A request for approval for the use of lithium batteries, including those encapsulated in integrated circuits, shall be submitted to the procuring activity at the time of submission of proposals. Approval shall apply only to the specific model proposed.

4.5 Accessories. Two X10 probes, one accessory pouch, and one grounding post shall be furnished with each oscilloscope.